Visualizations in Time for a New Look at the Movies

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ABSTRACT

Movies are considered an important art form, a source of entertainment, and a powerful method for educating, having great power to affect us, perceptually, cognitively, and emotionally. A huge amount of movies and related information are becoming increasingly available due to technological advances, demanding new and more powerful ways to search, browse, and view this interesting but complex information space that changes over time. Time-oriented visualization can help to capture, express, understand, and effectively navigate movies over time: both the time when they were released, or viewed, and the time along which their contents are weaved, in each movie. This paper presents the design and evaluation of the authors’ work towards the inclusion of the time dimension in 2D and 3D visualizations, based on colors and tag clouds, at the movies space level, and down to the individual movies in an interactive Web application to access, explore, and visualize movies based on the information conveyed in the different tracks or perspectives of its content, especially audio and subtitles where most of the semantics is expressed. Moreover, it is the authors’ aim to help provide insights through analytical, ludic, or artistic uses, since it is the aim of these visualizations to provide non-usual kinds of search, whether the user wants a movie to watch or to be aware of the properties in its content. The authors tested the pertinence and effectiveness of the main visualizations, and the results provided a better understanding of what is more effective and appreciated, and encouraged them to continue extending and refining their work.

Keywords: 2D, 3D, Art, Color, Content Based Retrieval, Interaction, Tag Clouds, Time, Videos, Visualization

1. INTRODUCTION

Movies play important roles in the arts, entertainment and education. They have an immense power to affect us, perceptually, cognitively and emotionally, by combining diverse symbol systems, such as images, texts, music and narration. The movie industry is very active, and technological advances are enabling the access to movies over the Internet and interactive TV, making accessible a space with a huge amount of movies and related information. However, all the richness that makes this movies space so interesting, inside each movie and outside where in many ways movies relate to each other, comes with a challenging complexity to handle. One of the problems is the fact that video is not a structured media type and it changes over

DOI: 10.4018/ijcicg.2014070103
time, and so, perceiving and searching all the data of a video is often not an easy task. The other is the huge amount of movies available that have been released over time.

Many researchers (Daniel & Chen, 2003) (Hauptmann, 2005) have stressed the importance to develop methods for extracting and highlighting interesting and meaningful features in video to effectively summarize and view them. Time-oriented visualizations could help to capture, express, understand and effectively navigate movies over time: both the time when they were released, or viewed, and the time along which their contents are weaved, in each movie. This is the focus of this paper.

The importance of visualization in conveying knowledge is undisputed, and having its roots in scientific reasoning, it has traditionally been viewed as an analytical tool for sense making (Viégas & Wattenberg, 2007). But its inherent aesthetic qualities have also been associated with its effectiveness. It has been argued that the higher the aesthetic value of the visualization is, the more engaged the viewer is in trying to decode its meaning. And actually, many visualizations resemble works of art (Lang, 2009) (Viégas & Wattenberg, 2007). Visualizations can be used to express a point of view, to induce the viewer to ponder in different aspects of our culture; as well as to analyze. Besides the more traditional disinterested analysis, it may be that much of the value of visualization comes from its ability to change attitudes. It is our intention, in the line of this work, to allow for both perspectives.

We have been designing, developing and extending MovieClouds (Chambel et al., 2013) (Gomes et al., 2014) as an interactive web application, to access, explore and visualize movies based on the information conveyed in the different tracks or perspectives of its content, especially audio and subtitles where most of the semantics is expressed, and with a special focus on the emotional dimensions, either expressed in the movies and felt by the users. It adopts a tag cloud unifying paradigm, from the movies space down to the individual movies. So far, movies space has been explored as a collection of movies based on their titles and overviews of their contents. Time has only been considered at each movie, through timelines of the different content perspectives.

In this paper, we present the design of our work towards the inclusion of the time dimension at the movies space level, and down to the individual movies to access their contents, through 2D and 3D visualizations, based on colors and tag clouds, as a revision and extension of (Jorge et al., 2012) and including a recent user evaluation. Time can be relevant to capture when movies were released, to access them or get additional overviews and insights about patterns or tendencies in movies content over time. For now, and due to the amount of information available, at the movies space level, we experimented mostly with movie genres and ratings. But we intend to address more content based information, like at the individual movie level, to find out, for example, if the amount of screams was a trend at some decade or around some periods (e.g. around Halloween), if movies tended to have more romantic audio mood or use more slang in speech at some point, and how this relates with their genres and ratings. This can provide support to more utilitarian uses of finding and navigating information and movies, to analytical tasks for getting overviews and understanding patterns, to get insights possibly in serendipitous ways (Chambel, 2011) (Chambel et al., 2013), or making evident and draw attention to some aspects related with the way movies and our viewing habits evolved and reflected or have influenced our culture over time, in more artistic ways.

Section 2 addresses the conceptual framework that informs our approach, in terms of visualization principles and time-oriented visualization. Section 3 presents related work. Section 4 presents our work on time-based visualizations of movies in MovieClouds, at the level of movies space and individual movies, and section 5 presents the user evaluation method and results. The paper ends with conclusions and perspectives for future work in section 6.
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